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# Novae Gesneriaceae Neotropicarum IX: *Cremospermopsis*, A New Genus from Colombia

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**ABSTRACT.** A new genus in the Gesneriaceae, *Cremospermopsis* L. E. Skog & L. P. Kvist, is described from the very humid forests in the Colombian departments of Antioquia and adjacent Bolívar. The new genus of two species, *C. cestroides* and *C. parviflora*, is similar and may be related to *Cremosperma*, but differs in having inflorescence bracts, unequal calyx lobes, and spherical papillate seeds.

**Key words:** Colombia, *Cremosperma*, *Cremospermopsis*, Gesneriaceae.

The flowering plant family Gesneriaceae is better represented in Colombia than in any other neotropical country, with approximately 400 known species according to a recent survey by Kvist et al. (1998). While identifying Colombian Gesneriaceae for that survey, the authors found collections of an undescribed gesneriad that is apparently endemic. This new genus, *Cremospermopsis*, is from a small area in the northwestern Colombian department of Antioquia, with two collections from adjacent Bolívar. Specimens of the new genus had often been filed in herbaria among unidentified material of Rubiaceae or (less frequently) Acanthaceae. A closer look demonstrates that *Cremospermopsis* cannot be a member of either of those families because of the presence of hypogynous flowers and the absence of stipules on the stems of the new genus. In addition, plants have unilocular capsules with many tiny seeds, four anthers with coherent stamens, and a more or less regular or divided nectary surrounding the ovary, characteristics that place the genus in the Gesneriaceae.

Other specimens of *Cremospermopsis* were recognized as Gesneriaceae, and mostly as unknown species of *Cremosperma* Benth. This was reason-

able since the two genera are similar in having connate calyx lobes and filaments adnate to the corolla tube base. The name of the new genus alludes to the similarity of *Cremospermopsis* to *Cremosperma*.

The two species of *Cremospermopsis* have a unique combination of characters, such as zygomorphic calyces, corolla limbs with glandular trichomes, and spherical papillate seeds, which justifies placing them in a new genus. They share more characteristics (e.g., erect habit, opposite leaves, calyx lobes connate, etc.) with *Cremosperma* than with any other genus, but are clearly distinguished by the presence of floral bracts.

We will not here assign *Cremospermopsis* to a tribe. Possible tribes are Beslerieae and Napeantheae, as defined by Wiehler (1983). The presence or absence of inflorescence bracts has been given much importance in the taxonomy of neotropical Gesneriaceae, mostly because Wiehler (1983) maintained an amended tribe Beslerieae, including *Besleria* L., *Cremosperma* Benth., *Gasteranthus* Benth., *Reldia* Wiehler, and *Resia* H. E. Moore, on the absence of floral bracts, a superior ovary, the lack of tubers or rhizomes, and seeds without funicles, etc., in the included genera. At the present time, however, the circumscription of Beslerieae may be open to question. For example, the discovery of a new subspecies of *Resia ichthyoides* Leeuwenberg having floral bracts led Skog and de Jesus (1997) to transfer the genus *Resia* from the Beslerieae to the formerly monotypic tribe Napeantheae where it seems better placed. The fact that species of *Cremospermopsis* also have bracts despite their close resemblance and possible relationship to *Cremosperma* makes it even clearer that tribal limits may well have to be reexamined. Table 1 compares *Cremospermopsis* with *Reldia* and *Cremosperma*



Table 1. Morphological comparison of *Cremospermopsis* with four other similar genera of Gesneriaceae.

Character state	<i>Cremospermopsis</i>	<i>Resia</i>	<i>Naepanthus</i>	<i>Cremosperma</i>	<i>Reldia</i>
Habit	Erect	Apical cluster	Rosulate to erect	Erect	Rosulate to erect
Leaf arrangement	Opposite	Congested	Congested	Opposite	Alternate
Inflorescence bracts	Present	Present or absent	Present	Absent	Absent
Calyx lobe connation	Present	Basal or to 1/3	Absent or rarely to 1/2	Present	Absent
Calyx lobe equality	Unequal	Equal	Equal	Equal	Equal to unequal
Corolla	Zygomorphic	Zygomorphic	Actinomorphic or rarely zygomorphic	Zygomorphic	Zygomorphic
Spur	Absent	Absent	Absent	Absent	Present
Corolla length vs. calyx length	Longer	Longer	Very short to nearly the same	Longer	Longer
Corolla throat	Glandular-hairy	Not glandular	± Glabrous	Glandular or not	Glandular or not
Filament adnation to corolla tube base	Adnate	Nearly free	Adnate	Adnate	Nearly free
Thecae confluent	Yes	No	Yes	Yes	Partly
Nectary	Present	Present	Absent	Present	Present
Seeds	Papillate	Striate	Striate	Striate	Striate



(both included in *Beslerieae*) as well as with *Napeanthus* and *Resia* (the two genera currently in the tribe *Napeanthae*).

Although *Cremospermopsis* appears to be most similar to *Cremosperma*, further studies are necessary to determine if *Beslerieae* might have to be expanded to include genera and species having floral bracts, or alternatively if *Cremosperma* should be transferred to *Napeanthae* together with *Cremospermopsis*.

***Cremospermopsis*** L. E. Skog & L. P. Kvist, gen. nov. TYPE: *Cremospermopsis cestroides* (Fritsch) L. E. Skog & L. P. Kvist.

Ad *Cremosperma* affinis sed in inflorescentiis congestis bracteatis in lobis calycis inaequalibus zygomorphis, cum trichomatibus glandularibus in capsulis in sicco fatiscen-  
tibus et seminibus sphaericis papillatis differt.

*Plants* herbs to subshrubs, erect or rarely appressed to ground. *Leaves* opposite, subisophyllous in pairs, blades mostly ovate, elliptic, obovate or oblanceolate, adaxially darker green than abaxially, lateral veins 8 to 12 per side; petiolate. *Inflorescences* umbel-like cymes, usually congested but occasionally relatively open, of several flowers, pedunculate and pedicellate; with mostly 4 lanceolate to ovate bracts from the apex of the peduncle. *Calyx* lobes connate between 1/3 and 2/3 of their length, subequal to strongly unequal, 3 or 4 lobes usually lanceolate, the remaining 1 or 2 much wider and ovate but variable even within the same inflorescence and even more unequal in fruiting than during flowering, all lobes directed forward and with entire margins. *Corolla* ecalcarate, funnelform to tubular, outside glabrous or glandular hairy, especially on the limb, inside glabrous; limb  $\pm$  bilabiate, lobes rotund, 3 lower lobes larger than 2 upper lobes. *Filaments* adnate to corolla tube base at least 2/3 of their length, glabrous, anthers coherent, thecae confluent, staminode sometimes but apparently not always present. *Nectary* annular or higher on both sides of ovary and low or absent in between. *Ovary* and style glabrous, stigma capitate. *Fruit* a dry capsule, compressed and with two grooves, dehiscing irregularly and disintegrating in the persistent calyx, which may function as a splash-cup; seeds very numerous,  $\pm$  regularly spherical, very small, surface papillate.

*Cremospermopsis* is easily recognizable by the combination of congested, bracteate inflorescences with small to tiny corollas lacking spurs, but having densely glandular hairy throats and limbs. Both species are particularly similar to species of *Cremosperma*, where the type species was formerly

placed. The unequal calyx lobes and the resulting zygomorphic calyces is an unusual feature, and other differences from *Cremosperma* include the presence of spherical, papillate seeds vs. narrowly elliptic non-papillate seeds in *Cremosperma*, and the abundance of glandular trichomes on the limb and in the throat of *Cremospermopsis*. The fruits are also different. The capsules in *Cremosperma* split (more or less regularly) but their valves remain surrounding the seed mass during dispersal, while the capsules of *Cremospermopsis* apparently disintegrate and virtually disappear leaving the seeds free in the persistent calyx.

The two *Cremospermopsis* species have similar geographical ranges almost completely restricted to the Colombian department of Antioquia (*C. cestroides* has also been collected twice in adjacent Bolívar). The species have both been collected at several different localities suggesting that they may also occur in the same habitat, viz., very humid forests and often close to streams. Plants have been collected from near sea level (in the Cauca River valley) to 1550 m elevation, but most collections come from between 500 to 900 m elevation, possibly corresponding to the low-elevation cloud forests with a very high Gesneriaceae diversity like that found in western Ecuador (Skog & Kvist, 2000).

Little is known about the ecology of the *Cremospermopsis* species, which have not yet been studied by the authors in their natural habitats. Both species have small flowers, not particularly conspicuous by their coloration, which varies from white to yellow, but the corolla limbs and throats have numerous glandular trichomes suggesting the liberation of substances that might attract pollinators. In addition, the expanded calyx lobes, which tend to be more conspicuous than the corollas particularly in *Cremospermopsis parviflora*, may also help to attract pollinators. The corolla tubes of *Cremospermopsis* flowers seem nearly blocked by the coherent anthers, which tend to be located about where the corolla tube is narrowest. However, both species have well-developed glands around the ovary suggesting that pollinators may indeed find nectar in the flowers.

*Cremospermopsis* has numerous tiny seeds like many other understory Gesneriaceae, and the surrounding persistent calyces may function as splash-cups, as the capsules seem to disintegrate at maturity. Water transport, and possibly small animals to which the papillate seeds may adhere, may disperse the seeds.

The status of the two *Cremospermopsis* species in the wild is unknown. It is possible, however, that



both species are endangered. Low-elevation humid forests in Antioquia have mostly disappeared, and humid forest Gesneriaceae tend to be very vulnerable to deforestation, as they cannot survive the exposure to dryer microclimates.

# KEY TO THE SPECIES OF *CREMOSPERMOPSIS*

- 1a. Corolla nearly 2 times as long as the calyx and not hidden by the calyx lobes; leaf blades oblanceolate or less commonly elliptic, apex acuminate . . . . . *C. cestroides*
- 1b. Corolla shorter than the calyx and hidden by the calyx lobes; leaf blades obovate or occasionally elliptic, apex obtuse or less frequently acute . . . *C. parviflora*

## ***Cremospermopsis cestroides* (Fritsch) L. E.**

Skog & L. P. Kvist, comb. nov. Basionym: *Besleria cestroides* Fritsch, Notizbl. Bot. Gart. Berlin 11: 962. 1934. *Cremosperma cestroides* (Fritsch) C. V. Morton, J. Wash. Acad. Sci. 28: 348. 1938. TYPE: Colombia. Antioquia: Guadalito, growing in forest shade, 2000 ft., 4 Feb. 1880, W. Kalbreyer 1391 (lectotype, designated here, K; B photo, US). Figure 1.

*Plants* herbs to subshrubs, stems erect (0.3–) 0.70–1.5(–2.0) m tall, to 7 mm diam., glabrescent below to distally pilose or villous and occasionally strigose, internodes (0.3–)1–5(–9) cm long. *Leaves* with blades oblanceolate or less commonly elliptic, 8–18(–22) × (2–)4–7(–9) cm, apex acuminate, base cuneate, rarely acute, margin remotely serrate to subentire, adaxially pilose to glabrous, abaxially ± sparsely pilose or strigose, secondary veins 8 to 12 per side, pilose or strigose below. *Inflorescences* of umbel-like cymes, of 3 to 15 flowers, pilose, strigose or puberulent; peduncles 2–5(–8) cm long, distally with 2 to 4 bracts, each ovate, 5–10 × 1–4 mm; pedicels 2–8 mm long. *Calyx* lobes green, occasionally red tinged, outside pilose especially along margin, inside glabrous, connate, subequal to unequal, lanceolate to ovate with acute to acuminate apex, all 8–10 mm long and up to 12 mm long in fruiting stage, 3 or 4 of the lobes only 2–4 mm wide and the other 1 or 2 lobes to 6 mm wide. *Corolla* tubular, 1.2–1.7 cm long, tube 1.0–1.4 cm, 1–2 mm wide at base, diam. 2.5–3.5 mm basally, narrowing to 2.0–2.5 mm and then ampliate to 3–4 mm distally, yellow or white, outside upper 2/3 of length glandular pilose to villous, inside glabrous except apically; throat 3.5–5 mm diam., limb yellow, densely glandular hairy with trichomes that may be short or have a more extended stalk of several cells, dorsal lobes often with pink or violet markings, 1.5–2 mm long, lateral and ventral lobes 2–3.5 mm long. *Filaments* adnate to corolla tube

base for 5–8 mm, above free for 1.5–3 mm; anthers 0.7–1.3 × 0.5–0.8 mm; nectary ± regularly annular, 0.3–0.7 mm high. *Ovary* 2 mm high. *Capsule* 5 × 3 × 2 mm.

*Distribution and ecology.* Plants are endemic to the Colombian departments of Antioquia and Bolívar, growing in disturbed primary or old secondary wet forest, along streams and in shady areas; (20–) 500–1000(–1550) m, and collected in flower in all months of the year, except April and November; in fruit in June, but probably most of the year.

*Cremospermopsis cestroides* is distinguished from the apparently more abundant *C. parviflora* (see below) by the acuminate leaf apices and by larger corollas of the former.

This species, described originally by Fritsch as a *Besleria* species and later transferred to *Cremosperma* by Morton, was typified by a specimen at B (Kalbreyer 1391). Unfortunately, the holotype is no longer extant, although a photograph of the specimen at B taken in the 1930s is lodged at US and probably in other herbaria. The duplicate of Kalbreyer 1391 at K is selected here as lectotype. It is remarkable that neither Fritsch nor Morton commented on the bracteate inflorescences on the types and clearly evident in the photograph of the holotype and on the lectotype specimen at K.

*Additional specimens examined.* COLOMBIA. **Antioquia:** Mpio. Anorí, 3 km from Providencia hydroelectric plant, valley near confluence of Tirana stream with Río Anorí, 28 km SW of Zaragoza, Alverson et al. 130 (COL); Mpio. Amalfi, 8–15 km from Amalfi to Rumazón, Salazar and La Playa sites, Betancur et al. 776 (F, MO, US); border with Bolívar department, near the confluence of the Ité and Tamar rivers into Cimitarra river, ca. 38 km W of Barrancabermeja, de Bruijn 1537 (MO, US); Mpio. San Luis, bank of Río Samaná Norte, above Medellín–Bogotá road, Callejas et al. 4104 (MO, US (2)); Mpio. Anorí, Dos Bocas–Providencia road, near Río Nechí, Callejas et al. 4466 (HUA, NY); Mpio. Remedios, vereda Santa Lucia, 9–18 km SW of Remedios along road to Puerto Berrio, Callejas et al. 8106 (HUA, US); Mpio. San Carlos, correg. Alto de Samaná, vereda Miraflores, Callejas et al. 8603 (HUA); Mpio. San Luis, Villa del Sol site, vereda La Cristalina on Medellín–Bogotá road, Callejas et al. 11159 (HUA); Mpio. San Francisco, Carretera de Aquitania, nacimiento de la quebrada La Cristalina, Cárdenas L. et al. 2629 (MO); Mpio. San Carlos, correg. Alto de Samaná, vereda Miraflores, Fonnegra et al. 3018 (HUA, MO, US); Mpio. San Luis, Río Samaná–Río Claro sector near Medellín–Bogotá road, Hernández et al. 124 (HUA, SEL), 469(4) (HUA), 675 (HUA); Mpio. San Luis, 8 km E of bridge over Río Caldera on Medellín road, Juncosa & Escobar 724 (MO, US); La Cuchilla, correg. El Prodigio, vereda Los Medios, Lázaro T. 99 (MO); San Luis, near Río Claro, Loaiza & Cogollo 33 (MEDEL); Mpio. San Luis, quebrada La Cristalina, Ramírez & Cárdenas 393 (COL, HUA), 543 (COL, HUA), 1123 (COL, HUA, MO); Mpio. Anorí, correg. Providencia, Río Anorí valley, between Dos Bocas and Anorí, Soejarto et al. 3283 (MEDEL); Mpio.





Figure 1. *Cremospermopsis cestroides* L. E. Skog & L. P. Kvist. —A. Stem apex. —B. Abaxial leaf margin. —C. Corolla exterior. —D. Opened corolla with 4 stamens and 1 staminode at lower left. —E. Infructescence with bracts. —F. Calyx. —G. Pistil with calyx and nectary. —H. Capsule surrounded by persistent nectary. —I. Seeds. A from *Fonnegra et al.* 3018; B, C, D from *Roldán & Betancur* 718; E, H, I from *Callejas et al.* 4104; F, G from *Callejas et al.* 4390.



Anorí, Buenos Aires, between Providencia and Alhibe, *Soejarto et al.* 4505 (MEDEL); Cordillera Central Autopista from Medellín to Bogotá, ridge above Río Cocorna, *Stein et al.* 3182 (MO); Mpio. Anorí, valley of Río Anorí along road 3–5 km upstream from Providencia Hydroelectric Plant, between Dos Bocas and Anorí, *Zarucchi* 3322 (MO, US). **Bolívar:** Mpio. Achi, correg. La Raya, refugio El Paraíso, near Ciénega Grande, 3–4 hours from Caucasia above Cauca river, *Callejas et al.* 4390 (HUA, MO, US(2)); Mpio. Achi, La Raya, *Cuadros & Gentry* 3587 (US).

***Cremospermopsis parviflora*** L. E. Skog & L. P. Kvist, sp. nov. TYPE: Colombia. Antioquia: Mpio. San Carlos, Embalse Punchiná, margin of streams leading into reservoir near site of dam, 6°12'N, 74°52'W, 780 m, 18 May 1988, *J. L. Zarucchi, O. Escobar & A. Ayala* 6651 (holotype, HUA; isotypes, MO, US). Figure 2.

*C. cestroidis* affinis sed foliis plerumque ad apicem obtusibus, tubo corollae a calycis lobis occultis.

*Plants* herbs, stems mostly erect, occasionally appressed to ground, 20–40(–60) cm tall, to 5 mm diam., glabrescent proximally to tomentose distally; internodes 0.5–1.5(–3) cm long. *Leaves* with obovate or occasionally elliptic blades, 8–20 × 4–12 cm, apex obtuse, or less frequently acute, base acute, margin subentire, occasionally rugose, adaxially glabrous, occasionally sparsely pilose, abaxially sparsely appressed pilose, secondary veins (8 to) 10 to 12 per side, below with appressed pilose to tomentose indumentum; petioles (0.5–)1–2 cm long, mostly tomentose. *Inflorescences* congested cymes but occasionally more open with an extended axis, of 5 to 12 (to 18) flowers; peduncles 2–9 cm long, pilose, sometimes dark purple, distally with mostly 4 bracts with often variable shapes and sizes in same inflorescence, each ovate to lanceolate, 0.7–1.2 cm long, mostly tomentose and light green to whitish; pedicels to 3 mm long. *Calyx* lobes light green to yellowish, outside pilose to tomentose, inside glabrous, connate and unequal, narrowly to broadly ovate, all 4–5 mm long, 3 or 4 of the lobes ca. 1 mm and the other 1 or 2 lobes to 3 mm wide. *Corolla* nearly hidden by surrounding calyx lobes and only the limb conspicuous, 5–6 mm long, tube funnelform to tubular, 3–4 mm long, ca. 1.5 mm wide at base, narrowing to nearly 1 mm and then ampliate to nearly 2 mm distally, white, glabrous both outside and inside; throat ca. 2 mm diam., densely glandular hairy with short trichomes, dorsal lobes often pink, up to 1 mm long, lateral and ventral lobe white or yellow, up to 2 mm long. *Filaments* adnate to corolla tube base for ca. 2 mm, above free for 0.5–1.5 mm; anthers ca. 0.6 × 0.4 mm; nectary ca. 0.8 mm high at both sides of ovary

but in between much lower or absent. *Ovary* 1.5 mm high. *Capsule* 3 × 2 × 1.5 mm.

*Distribution and ecology.* Plants of *Cremospermopsis parviflora* are endemic to Colombia (Antioquia), growing on streamsides in disturbed primary wet forest or old secondary rain forest at (400–)500–900(–1250) m, and collected in flower in January to June, October and December, in fruit in April, August, and November.

The tiny corollas of *Cremospermopsis parviflora* are nearly hidden by the calyx lobes, a character that distinguishes the species from *C. cestroides*, which has corollas approximately twice as large and not hidden by the calyx lobes. The calyces and bracts of *C. parviflora* are apparently also mostly pale green to white while these may be darker green to yellow or red in the other species. In addition, *C. parviflora* is a small herb that rarely exceeds 50 cm, while *C. cestroides* can often be more than 1 m tall, and may be somewhat subshrubby. *Cremospermopsis parviflora* also tends to have ovate leaves with an obtuse apex and a nearly entire margin contrasting with the mostly oblanceolate leaves with an acute apex and a remotely serrate margin in *C. cestroides*. The indumentum of the former tends toward pilose while the latter has a rather tomentose indumentum.

*Paratypes.* COLOMBIA. **Antioquia:** Lake Punchiná, 47.5 km E of San Carlos, *Brant et al.* 1661 (HUA, MO, US); Mpio. San Luis, vereda La Josefina, above the Medellín–Bogotá road, 16 km SW of San Luis, *Callejas et al.* 4186 (NY, US); Mpio. San Luis, veredas La Cristalina & La Josefina, Río Claro region, 98 km SE of Medellín, *Callejas & Acevedo* 11167 (HUA); Mpio. San Luis, vereda las Confusas, *Cardenas et al.* 2670 (MO); Mpio. San Luis, vereda La Josefina, quebrada La Mariola, *Cardenas & Ramírez* 2729 (MO); Mpio. San Luis, carretera to Aquitania, 12 km from Medellín–Bogotá road, *Cogollo et al.* 3756 (MO); Mpio. San Luis, vereda La Josefina, quebrada La Mariola, *Cogollo et al.* 4285 (MO); Mpio. San Francisco, correg. Aquitania, Río Venado, *Fonnegra et al.* 4183 (MO, US); Mpio. San Luis, Río Samaná–Río Claro sector near Medellín–Bogotá road, *Hernández et al.* 191 (HUA, SEL), 211 (HUA, SEL), 280 (HUA); San Luis, Río Claro, *Loaiza & Cogollo* 42 (MEDEL); Mpio. Amalfi, NE of Salazar, along road between Amalfi and Fraguas 23–26.5 km from Amalfi, *MacDougal et al.* 4025 (US); bank of Guatapé river between San Rafael and Holanda, *Orozco et al.* 729 (COL (2)); Mpio. San Carlos, near ISA hydroelectric dam reservoir, *McPherson* 13330 (HUA); Mpio. San Luis, quebrada La Cristalina, *Ramírez & Cárdenas* 232 (HUA, MO), 367 (COL, HUA, MO), 599 (HUA), 1127 (COL, HUA), 1350 (MO), 1517 (COL, HUA), 1922 (HUA, MO); road from Independencia to Santa Rita, *Romero-Castañeda* 1573 (COL); Mpio. Anorí, Río Anorí valley near Planta Providencia, *Shepherd* 456 p.p. (MO), 564 p.p. (WIS); Mpio. Anorí, Río Anorí valley between Dos Bocas and Anorí, close to Planta Providencia, SW of Zaragoza, *Shepherd* 456 p.p. (COL), 564 p.p. (COL, MEDEL); Mpio. Anorí, near Providencia hydroelectric plant, *Soejarto & Villa* 2692 (GH (2)), 2693 (GH (2)); Mpio. Amalfi, mina



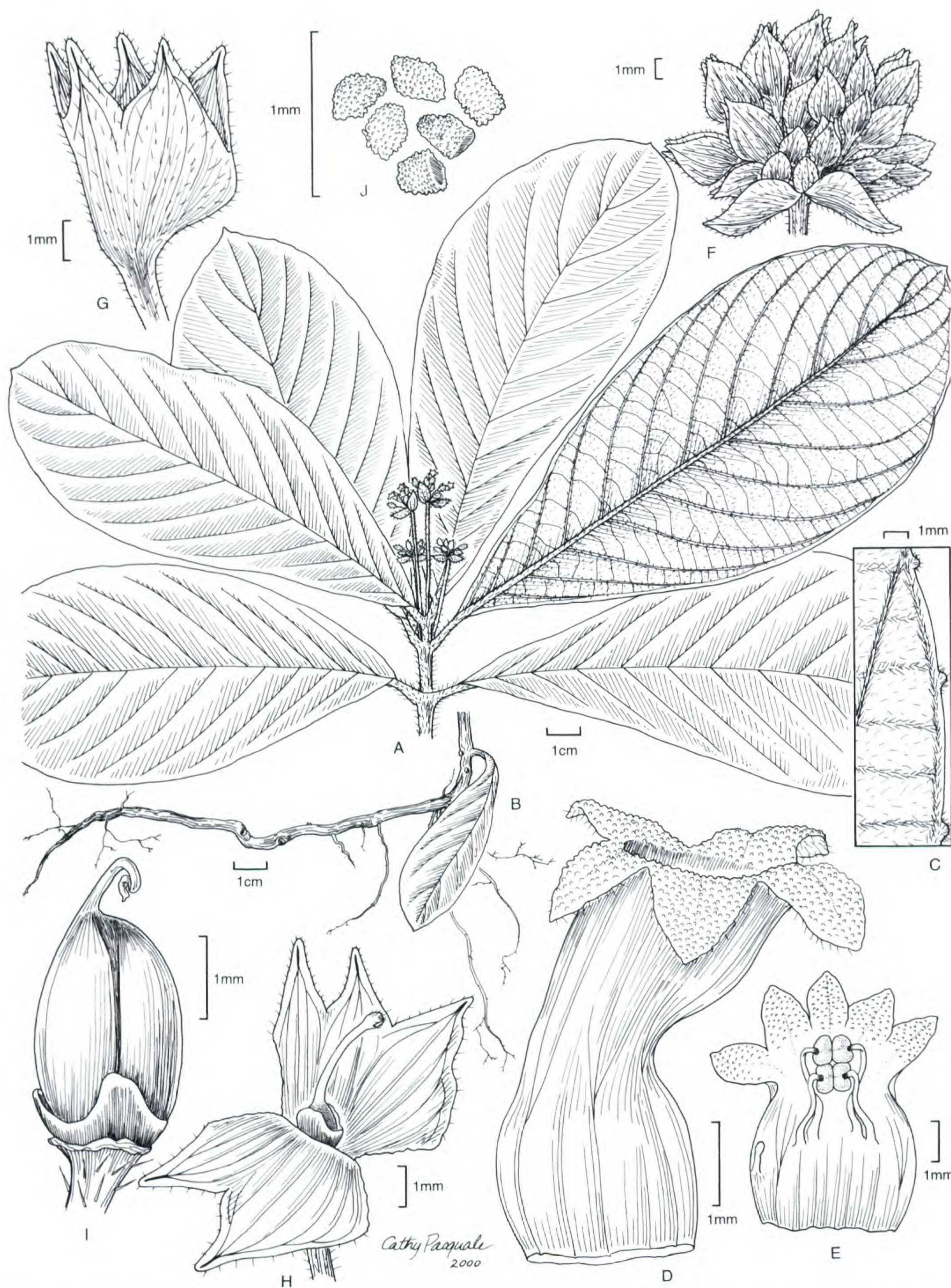


Figure 2. *Cremospermopsis parviflora* L. E. Skog & L. P. Kvist. —A. Stem apex. —B. Stem base. —C. Abaxial leaf margin. —D. Corolla exterior. —E. Opened corolla with 4 stamens and 1 staminode at lower left. —F. Infructescence with bracts. —G. Calyx. —H. Pistil with calyx and nectary. —I. Capsule surrounded by persistent nectary. —J. Seeds. A from Ramírez & Cárdenas 367; B, D, E, G, H from MacDougal et al. 4025; C from Zarucchi et al. 6651; F from Soejarto & Villa 2692; I from Shepherd 564; J from Romero-Castañeda 1573.



La Vetilla, edge of quebrada Vetillita, *Tuberquia* & Gómez 20 (HUA); Mpio. Anorí, Anorí river valley near Providencia electric plant ca. 35 km SW of Zaragoza, *Waide* 62408 (US).

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